

Another point to be emphasized is the great need of judgment in determining the amount of serum to give intraspinaly. We believe it imperative to drain the spinal canal as frequently as the case demands, but not to give serum on each occasion a puncture is made. Through irritation of the meninges by superfluous serum a turbid fluid with high cell count may result. We feel there is no doubt that in many instances the clinical symptoms of epidemic meningitis are prolonged by the continual injection of serum intraspinaly far in excess of the amount required to obtain a cure.

OBSCURER INFLAMMATIONS OF THE CAUDA EQUINA: REPORT OF CASE AND OPERATION

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In 1914, Kennedy, Elsberg and Lambert¹ reported five cases of a peculiar recurrent disease of the nerves of the cauda equina. In this series they demonstrated not only the great benefit to be derived from operation, but also much of the pathology of the disease.

As I have had occasion to operate recently in a case that closely resembled Case 4 in the foregoing series, an account of it may add something to the study of the subject.

REPORT OF CASE

History.—A. G. R., man, aged 48, until five years before I saw him lived in Mexico. His father and sister died of tuberculosis. He had never had any serious illness except "stomach trouble" five years before, which lasted about a month, and the backache which preceded his present illness. This backache appeared eight years before. The first attack lasted two months, but on removing from Guadalajara to Vera Cruz he was immune for a year. At the end of that time he came to Los Angeles, and the backache returned in attacks every month until October, 1917, when the pain became continuous and was now associated with a sensation of numbness over the front of the right thigh. In March, 1918, after one remission, the numbness extended to the right ankle and sole of the foot, and there was a painful weakness of the arch when walking. March 10, he noticed numbness on the inner side of the left shin. Until March 10 he had been able to work and walk without a stick, but, after a series of osteopathic manipulations, which at times were very painful, he developed a sensation of a tight band around both Poupert's ligaments, and also around the knee and ankle on the right side. He used a stick until April 1, when he was compelled to stop work, and on May 1 collapsed entirely and had to be carried.

Examination.—Dr. Alfred Fellows saw him, May 5, and called me in, May 6. The patient was pale, thin, sallow and nervous in appearance. He was seated in an easy chair, but could not raise either foot from the ground. He could raise the right heel slightly. There was an almost complete flaccid paralysis of both lower limbs. Marked foot-drop had evidently existed for quite a while on the right side, as complete passive dorsiflexion was impossible beyond a right angle. There was complete absence of both knee jerks and also of both plantar reflexes. The feet were swollen, purplish and cold, especially the right foot. There was considerable atrophy of the muscles of both legs and both thighs. There was anesthesia over the dorsum of the right ankle and right sole, but elsewhere very little alteration of sensation except a marked saddle anesthesia (above) on both sides of the anus and inner aspects of the buttocks and to a lesser extent of the scrotum. There was no dissociation. Areas of hyperesthesia were noted on the right leg and foot. The abdominal reflexes were present; the cremasteric reflexes were slight. The bulbocavernosus reflex was absent. Above the waist line there were no special physical signs.

At this examination the patient complained of severe and continuous pains in the lumbar region and down the right leg (the outer side especially) and less severe in the left leg. Also there had been difficulty of micturition for the past two weeks, and constipation for years. Cramps in the legs and

"electric shocks" were also complained of in the legs. He denied syphilis. The Wassermann test was negative, both as to blood and spinal fluid.

May 8, there was complete retention of urine.

Operation and Result.—May 9, operation was performed in the California Hospital. The roentgenograms being quite negative, I removed the arches of the eleventh and twelfth dorsal and first and second lumbar vertebrae. The epidural fat was very scant. On exposure, the dura mater was seen to be dark and swollen and to have spontaneously ruptured. A vertical slit was present through which the congested cauda endeavored to extrude. A light tampon was placed above the swelling between the dura and the bone, and the dura freely opened. The dura was smooth on its inner aspect.

The following condition was found: The posterior roots on the left side appeared nearly normal, but those of the right side were inextricably imbedded in a purplish mass of what seemed to be inflammatory material, molding itself into a smooth tumor-like substance closely applied to the lateral wall of the spinal canal as one traced it forward as far as possible without causing further trauma to the nerve tissues. It extended all the way around to the front of the right cauda, and I have no doubt from the symptoms that it also involved the left anterior roots; but it seemed so probable that an attempt to unravel the adhesions in that confused mass might forever damage the bladder mechanism, and thus abolish the chances of natural resolution that I decided to search no farther for the boundaries of the mass or even for the conus above it, and contented myself with thorough irrigation with mercuric chlorid 1:1,000, and as it was impossible to close the dura, I stitched the muscles carefully together over the cauda after removing the tampon. Very little cerebrospinal fluid escaped. The dura was left wide open to insure full decomposition. A little fluid escaped next day, but none thereafter.

Immediate relief from pain followed the operation and has continued to the present. The bladder acted normally for a week after operation, when the patient had an attack of acute retention, and required catheterization for two weeks, since which time he has passed urine normally. The muscular power has steadily increased so that now he can walk well with one stick, and up and down stairs. He contemplates returning to work next month. Slight saddle anesthesia is still present. Both knee jerks are present, the left more than the right. The left plantar reflex is present, the right absent. The left leg is carried normally in walking, but the right is rather high-stepping. Right foot-drop is still present. The left ankle movements are strong in all directions. Both thighs can be powerfully flexed on the abdomen. The heel and toe pointing test is good, but better on the left. Sensation everywhere is normal, even on the right foot, excepting only the slight saddle hypesthesia and a very slight band sensation in the region of the right knee. Swelling and blueness of the feet have disappeared. Sexual desire and the power of erection have returned. Both legs are considerably more muscular, and the patient has gained in weight and improved in color. His tongue has still the thick coat of gray fur that it has carried for years. The dorsum of the right foot is now slightly hyperesthetic. The bulbocavernosus reflex is absent. Lasèque's sign is positive on both sides, but more on the right.

Medicinal Treatment.—Since the operation, hexamethylenamin and potassium iodid were given on alternate days for the first seven weeks, after which the potassium iodid was alternated with an iron, arsenic and strychnin mixture.

Securing a Workable Amount of Function in a Disabled Limb.—It is easy to overlook the importance of training a limb to perform its function more or less regardless of anatomic perfection. It is easy to overlook the fact that, if one joint is defective, other associated joints will make good the deficiency. An illustration of an actual case may be of service. A man with both forearm bones broken has cross-union interfering with pronation and supination. Now the greatest and most powerful movements of pronation and supination take place by means of internal and external rotation of the shoulder joint; therefore, proceed to cultivate that substitute.—Col. H. E. Deane, *Gymnastic Treatment for Joint and Muscle Disabilities*.

1. Kennedy, Foster; Elsberg, C. A., and Lambert, C. I.: *Am. J. M. Sc.* 147: 645, 1914.